

REQUIRED MATERIALS	PART NUMBER
Brake Fluid	SAE J1703 or FMVSS No. 116 DOT 3
Vinyl Tube for Brake Bleeder	-
Clear Plastic Bottle (to Bleed Brake Fluid into)	-

REQUIRED EQUIPMENT	SUPPLIER	PART NUMBER
TIS Techstream*	ADE	TSPK0
NOTE: Software version 4.11.000 or later is required.		

\* Essential SST.

**NOTE**

Additional TIS Techstream units may be ordered by calling Approved Dealer Equipment 1-800-368-6787.

SPECIAL SERVICE TOOLS (SST'S)	PART NUMBER
GR8 Battery Diagnostic Station*	00002-MCGR8

\* Essential SST.

**NOTE**

Additional SSTs may be ordered by calling 1-800-933-8335.

## Required Tools & Equipment

## Repair Procedure Overview

The brake bleed procedure consists of 5 main sections:

### ^ Section 1: Zero Down Accumulator Pressure (Zero Down)

This procedure is used to release the pressure from the accumulator prior to bleeding the brakes (or replacing the brake actuator). Techstream for this procedure.

### ^ Section 2: Disable Electronic Controlled Brakes (ECB Invalid)

This procedure using Techstream disables the ECB system temporarily to allow the front brakes to be bled manually. Using Techstream to brake control causes the master cylinder cut solenoid to turn OFF and the line from the master cylinder to front brake calipers to open allow manual bleeding of the front brakes.

### ^ Section 3: Front Brake Bleed - Manual Process

This is a two-man process in which one technician pumps and holds the brake pedal while another technician opens the right front bleeder to remove air from the system. The same procedure is repeated for the left front.

### ^ Section 4: Rear Brake Bleed

#### ^ Right Rear Brake Line Air Bleed

During this procedure Techstream opens the solenoid for the right rear brake line and then the accumulator pump runs during this process and fluid and air out of the right rear caliper bleeder valve. During this process the brake pedal is NOT applied - the accumulator pump will automatically pump fluid out of the right rear caliper bleeder valve. This process bleeds the red brake line (suction line from the accumulator) and passes air out through the right rear caliper bleeder.

#### ^ Left Rear Brake Line Air Bleed

The left rear brake line is bled using a combination of the brake pedal being pressed-and-held and the accumulator pump.

#### Section 5: Reset Memory and Linear Valve Offset Calibration

The purpose of this step is to erase all previously memorized brake actuator linear valve calibration values and to re-calibrate the brake actuator linear valves after all brake bleeding procedures are finished. This procedure resets the memory of the skid control computer and then per Linear Valve Offset Learning Process. During the Linear Valve Offset Learning Process the skid control computer memorizes the characteristics of the actuator linear solenoids.

## Section 1: Zero Down Accumulator Pressure (Zero Down)

### IMPORTANT

When the actuator is replaced, there is no pressure in the accumulator and the Zero Down procedure is NOT necessary.

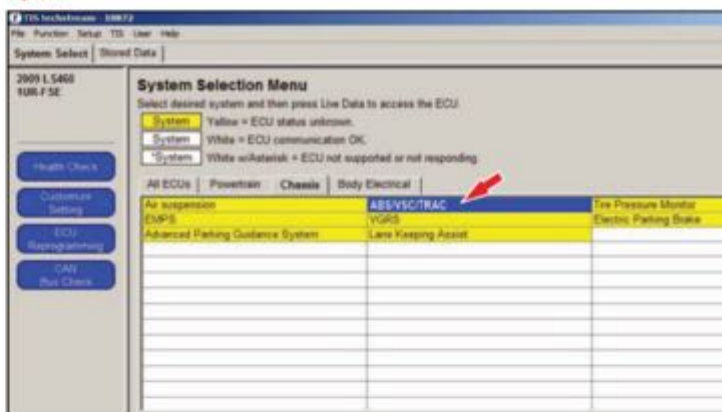
If the actuator has just been replaced and no bleeding has yet been performed, DO NOT connect accumulator connectors and press the Start/Stop button to the ignition ON position. (If the connectors are plugged in and the ignition is turned "ON", pressure will be built in the accumulator.)

Press the "Engine Start/Stop" button to the ignition ON position, then start with "Section 2: Disable Electronic Controlled Brakes (ECB Invalid)".

This procedure releases pressure from the accumulator.

1. Connect a battery charger to maintain battery voltage.
2. Press the "Engine Start/Stop" button to the ignition ON position.

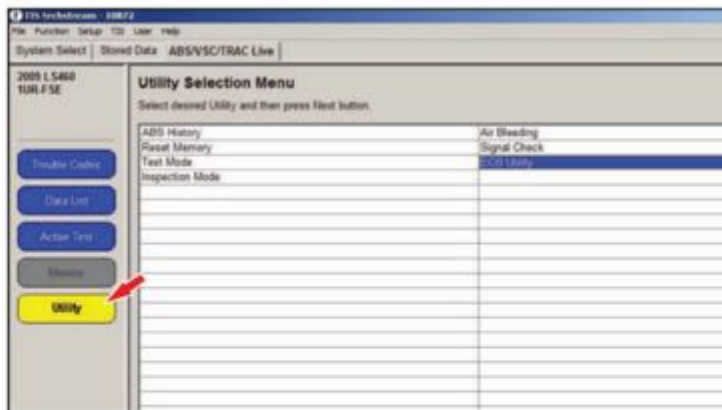
Figure 1.



3. Using Techstream navigate to the following menu:

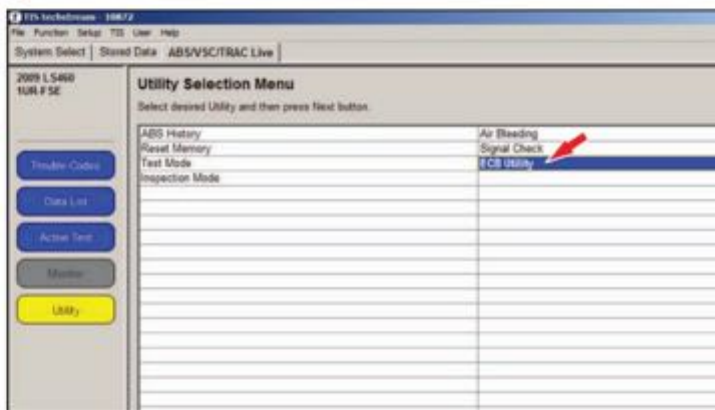
ABS/VSC/TRAC

Figure 2.



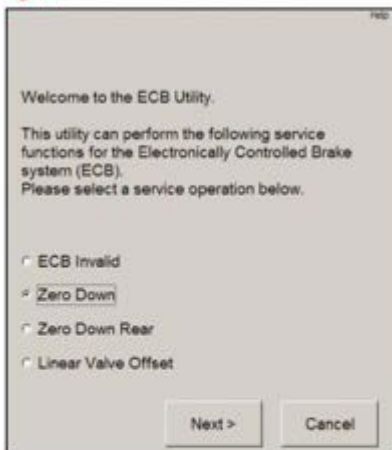
4. Select the "Utility" menu.

Figure 3.



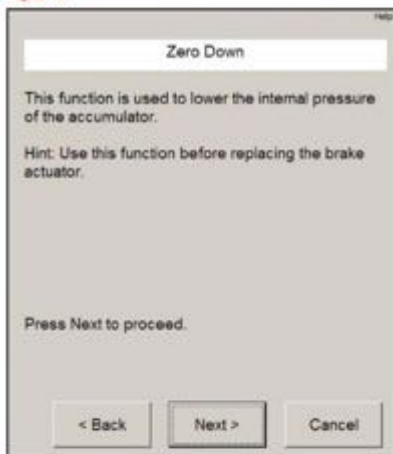
5. Select "ECB Utility".

Figure 4.



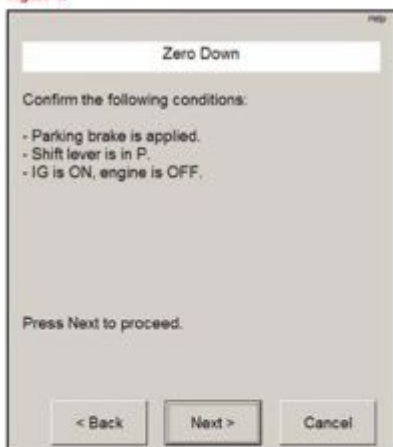
6. Select "Zero Down" from the ECB Utility screen and press "Next".

Figure 5.



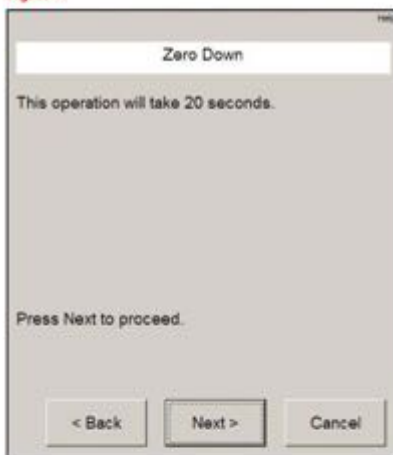
7. Press "Next" to proceed.

Figure 6.



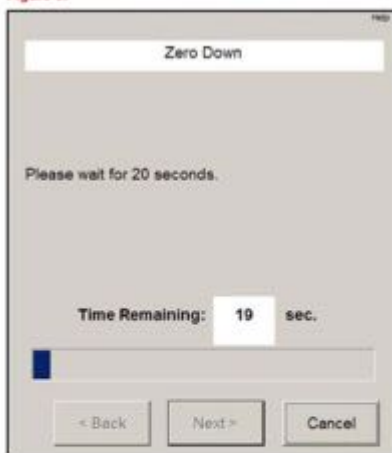
8. Confirm the conditions listed on Techstream and press "Next".

Figure 7.



9. Press "Next" to proceed.

Figure 8.



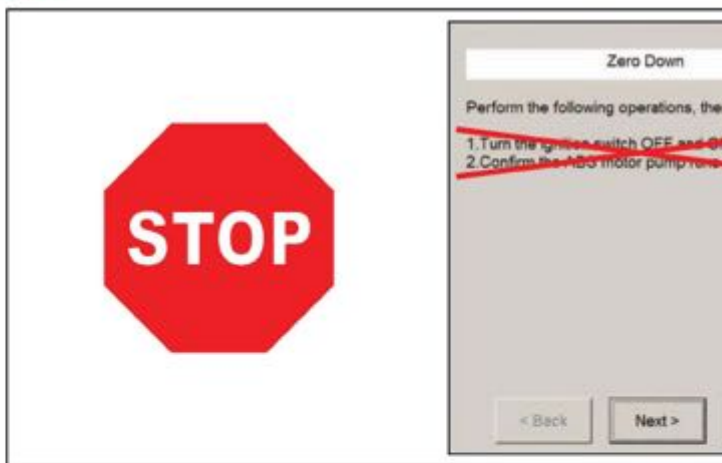
10. Wait for the Zero Down process to finish and press "Next".

**NOTE**

The Zero Down process will take 20 seconds to complete.

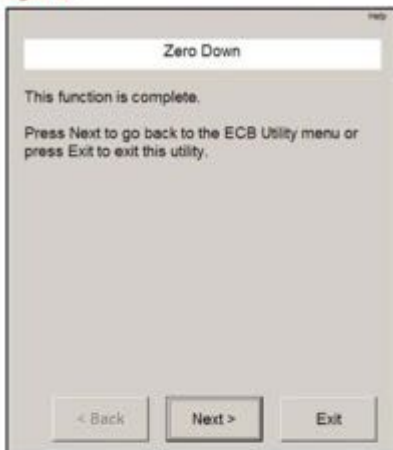
The Low Pressure beeper will sound at the end of Zero Down to indicate the accumulator pressure is low. This is normal.

Figure 9.



11. STOP - DO NOT turn the ignition OFF and ON as instructed by Techstream. Just press "Next".

Figure 10.



12. Once the "Zero Down" function is complete, press "Exit".

Figure 11.

Parameter	Value	Unit	Parameter
ABS Warning Light	Off		Yaw Rate Sensor
VSC Warning Light	Off		Zero Point of Yaw Rate
Brake Warning Light	Off		Yaw Rate Sensor2
Slip Indicator Light	Off		Zero Point of Yaw Rate2
ECB Warning Light	Off		Steering Angle Sensor
Buzzer	On		Zero Point of Steering Angle
Stop Light SW	Off		FR W/C Sensor
Parking Brake SW	On		FL W/C Sensor
TRC/TRAC/VSC OFF SW	Off		RR W/C Sensor
Resistor Warning SW	Off		RL W/C Sensor
Main Idle SW	On		Lateral G
Gear Position	P/N		Forward and Rearward G
Shift Lever Position	P/N		Yaw Rate Value
Shift Information	Off		Steering Angle Value
Inspection Mode	Other		FR Wheel Speed
Number of IG Chk(Inspection)	256		RR Wheel Speed
Master Cylinder Sensor	0.47	V	FL Wheel Speed
Voltage of M/C	0.00	V	RR Wheel Speed
Master Cylinder Sensor2	0.47	V	RL Wheel Speed
Voltage of M/C2	-0.01	V	Vehicle Speed
Stroke Sensor	0.34	V	FR Wheel Acceleration
Voltage of Stroke Sensor	-0.03	V	FL Wheel Acceleration
Stroke Sensor2	4.07	V	RR Wheel Acceleration
Voltage of Stroke Sensor2	-0.07	V	RL Wheel Acceleration
Accumulator Sensor	0.56	V	FR Wheel Direction
Deceleration Sensor	0.430	m/s2	FL Wheel Direction

13. Navigate back to the ABS/VSC/TRAC utility menu select "Data List" then "Accumulator Sensor", and check accumulator pressure. Press be approximately 0.5 volts.

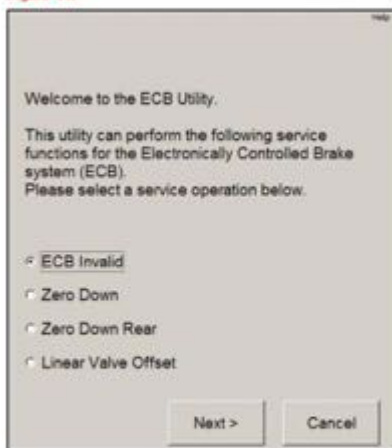
14. Press the "Engine Start/Stop" button to the ignition OFF position.





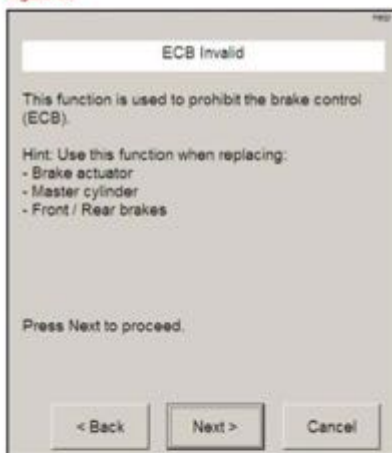
2. Select "ECB Utility" from the Utility menu screen.

Figure 14.



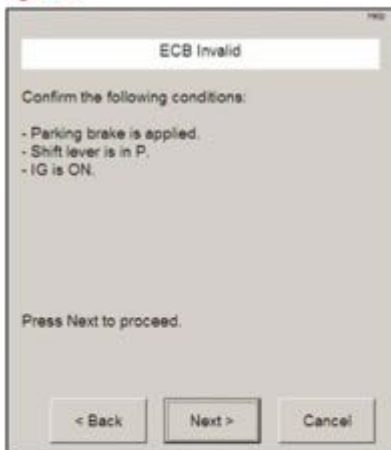
3. Select "ECB invalid" from the ECB Utility screen, and press "Next".

Figure 15.



4. Press "Next" to proceed.

Figure 16.



5. Confirm the conditions listed on Techstream and press "Next".

Figure 17.



6. STOP - DO NOT turn the ignition OFF as instructed by Techstream. Press "Next" - DO NOT PRESS "Exit".

### Section 3: Front Brake Bleed - Manual Process

#### NOTE

- ^ Keep doors closed during bleeding.
- ^ Ignition must be ON before starting this procedure.

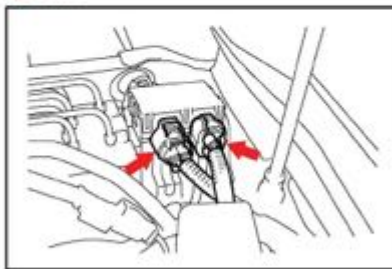
1. Connect a clear vinyl tube to the FR (Front Right) bleeder screw.
2. Pump and hold pressure on the brake pedal while an assistant opens the bleeder screw.

#### NOTE

Make sure fluid level in reservoir does NOT fall below the low mark during this procedure.

3. When fluid/air bubbles stop coming out tighten the bleeder screw and then release the brake pedal.
4. Repeat steps 2 and 3 until all air is removed from the FR line.
5. Connect a vinyl tube to the FL (Front Left) bleeder screw.
6. Repeat steps 2 and 3 until all air is removed from the FL line.
7. Press the "Engine Start/Stop" button to the ignition OFF position.

Figure 19.

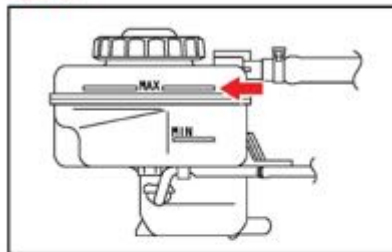


8. Connect the accumulator pump electrical connectors.
9. Press the "Engine Start/Stop" button to the ignition ON position.

#### IMPORTANT

- ^ Accumulator pressure must be approximately 0.5 volts before starting the rear brake bleed procedure.
- ^ You should NOT hear the accumulator pump motor run after the ignition is turned ON. If the accumulator pump runs after ignition ON, return to "Section 1: Zero Down Accumulator Pressure".

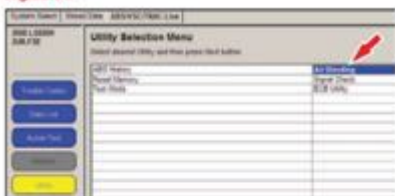
Figure 20.



10. Check and adjust the brake fluid level to MAX.

## Section 4: Rear Brake Bleed

Figure 21.



1. Select "Air Bleeding" from the Utility menu screen.

Figure 22.



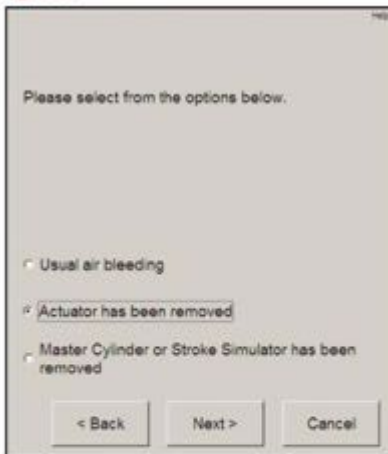
2. Press "Next" from the Air Bleeding Utility screen.

Figure 23.



3. Confirm the conditions listed on Techstream and press "Next".

Figure 24.



Please select from the options below.

Usual air bleeding

Actuator has been removed

Master Cylinder or Stroke Simulator has been removed

< Back      Next >      Cancel

4. Select "Actuator has been removed" and press "Next".

Figure 25.



5. STOP - DO NOT turn the ignition OFF as instructed by Techstream.

DO NOT unplug relays or disconnect accumulator connectors. Select "Next" - But DO NOT turn the ignition OFF.

Figure 26.



6. Press "Next" through the Techstream screens concerning front brake bleed - front brakes have already been manually bled in section 3.

Figure 27.



7. Press "Next" through the FR (Front Right) and FL (Front Left) brake bleed Techstream screens.

**Figure 28.**



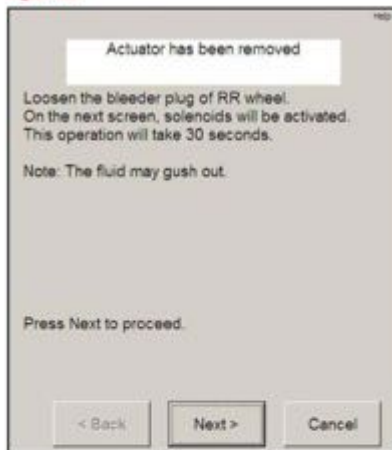
8. Press "Next" through the FL brake bleed Techstream screens.

**Figure 29.**



9. Press "Next" at this screen since front brakes have already been manually bled.

Figure 30.



10. Follow the instructions on Techstream and press "Next".

**IMPORTANT**

DO NOT press the brake pedal at this time.

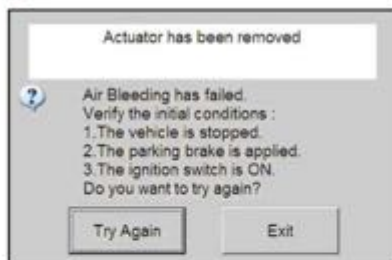
A. Attach the vinyl tube and bottle.

B. Loosen the RR (Rear Right) bleeder screw.

**NOTE**

This step removes air from the RR (Rear Right) line and actuator.

Figure 31.

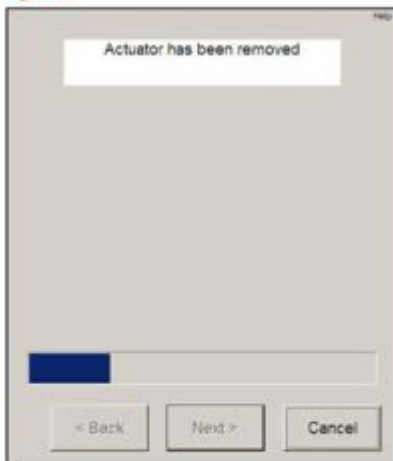


If Techstream displays the message shown in Figure 31:

- ^ Repeat "Section 1: Zero Down Accumulator Pressure".
- ^ Repeat "Section 2: Disable Electronic Controlled Brakes".
- ^ Repeat "Section 3: Front Brake Bleed"; except for manually bleeding front brake circuits.
- ^ Repeat "Section 4: Rear Brake Bleed".



Figure 32.



11. DO NOT press the brake pedal.

During this step Techstream opens the solenoid in the actuator for the RR line and then runs the accumulator pump.

**NOTE**

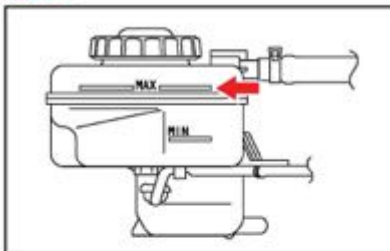
This step takes 30 seconds.

Figure 33.



12. Tighten the bleeder screw and press "Next".

Figure 34.



13. Adjust the brake fluid level to MAX before bleeding RL (Rear Left).

Figure 35.



14. Follow instructions on Techstream for RL (Rear Left) brake then press "Next".

**NOTE**

- ^ Press and hold the brake pedal during RL (Rear Left) brake bleeding.
- ^ The accumulator pump will run when the RL brake bleeder screw is opened.

Figure 36.



15. Wait for completion of operations listed on Techstream then press "Next".

Figure 37.



16. Wait for completion of operations listed on Techstream, then press "Next".

Lowering accumulator pressure takes 20 seconds.

Figure 38.



17. Follow instructions on Techstream and press "Next".

**NOTE**

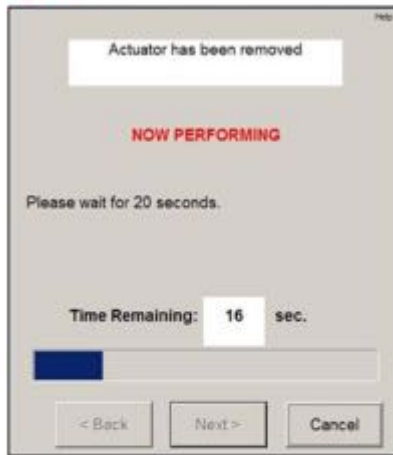
Techstream will instruct you to perform the accumulator Zero Down procedure 4 times.

Figure 39.



18. Press "Next" to proceed.

Figure 40.



19. Follow instructions on Techstream and press "Next".

Figure 41.



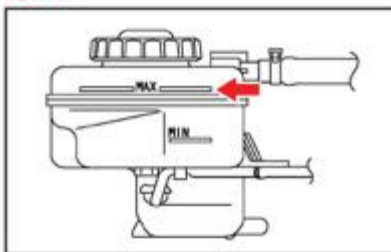
20. Press "Next" after cycling the ignition switch OFF and then ON. Press "Next" AFTER the pump motor stops running.

Figure 42.



21. Perform the "Zero Down" procedure 4 times, per Techstream. At the end of the 4 "Zero Down" procedures, the "Air bleeding is complete" will be displayed. Press "Exit".

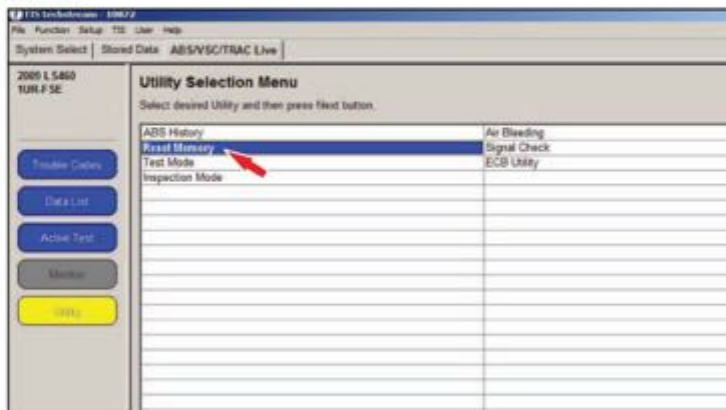
Figure 43.



22. Check and adjust the brake fluid level to MAX.

## Section 5: Reset Memory and Linear Valve Offset Calibration

Figure 44.



1. Select "Reset Memory" from the Utility menu screen.

Figure 45.



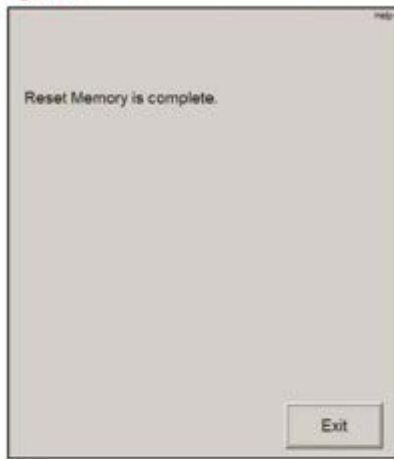
2. Confirm the conditions listed on Techstream and press "Next".

Figure 46.



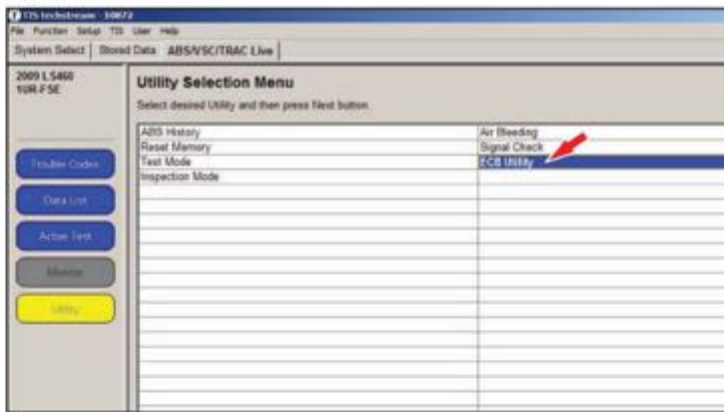
3. Press "Next" to proceed.

Figure 47.



4. Press "Exit".

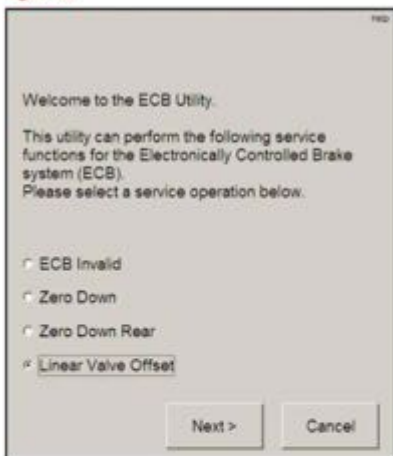
Figure 48.



5. Select "ECB Utility" from the Utility menu screen.

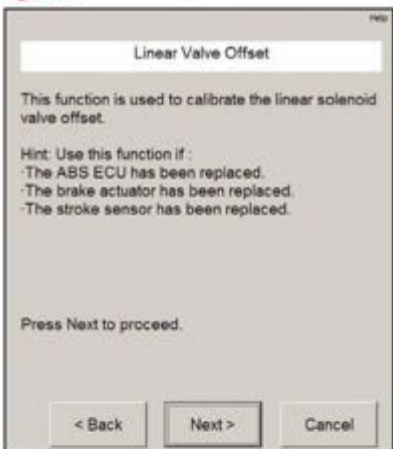


Figure 49.



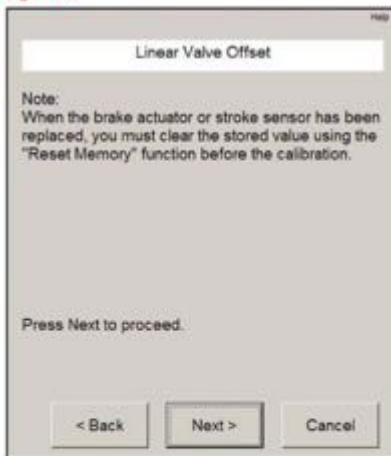
6. Select "Linear Valve Offset" from the ECB Utility screen and press "Next".

Figure 50.



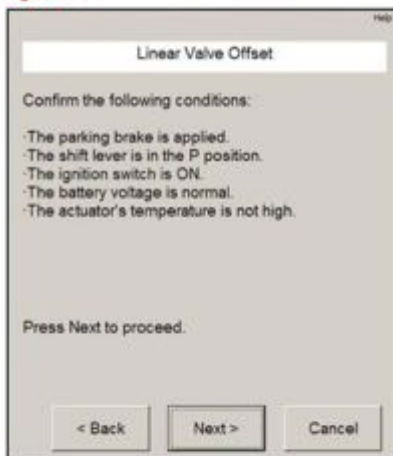
7. Press "Next" to proceed.

Figure 51.



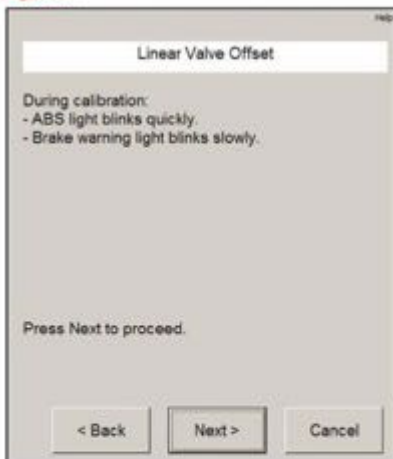
8. Press "Next" to proceed.

Figure 52.



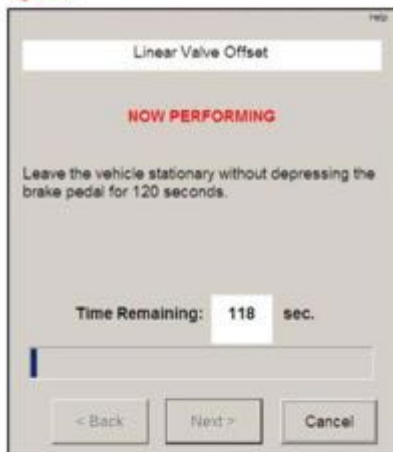
9. Confirm the conditions listed on Techstream and press "Next".

Figure 53.



10. Press "Next" to proceed.

Figure 54.



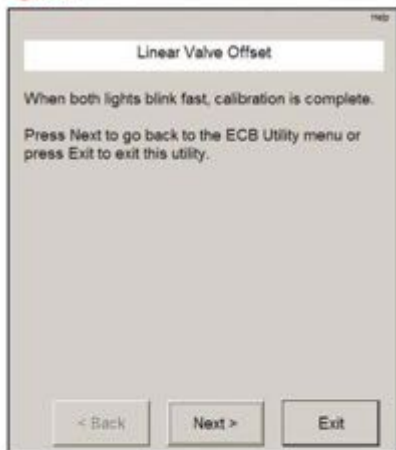
11. Techstream is now performing Linear Valve Offset.

DO NOT depress the brake pedal at this time.

**NOTE**

This process takes 120 seconds.

Figure 45.



12. Press "Exit".

13. Clear all stored DTCs.

14. Test drive vehicle to confirm NO warning lights illuminate and there are NO abnormal brake concerns.

15. Verify the squawk/bark noise has been eliminated.